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(54) Vehicle door handle

(57) A handle (1) for a vehicle door (2), wherein accidental rotation, due to impact, of a rocker arm (6) about an axis (7) and from a closed position to an open position respectively closing and opening a lock (5) on the door (2) is prevented by a pendulum-type retaining body (9), which is connected to a fixed fork (20) by means of at least one rigid pin (27) (41, 42), and rotates by force of inertia, on the fork (20) and in opposition to a spring (30) (45), into a retaining position retaining the rocker arm (6) in the closed position.

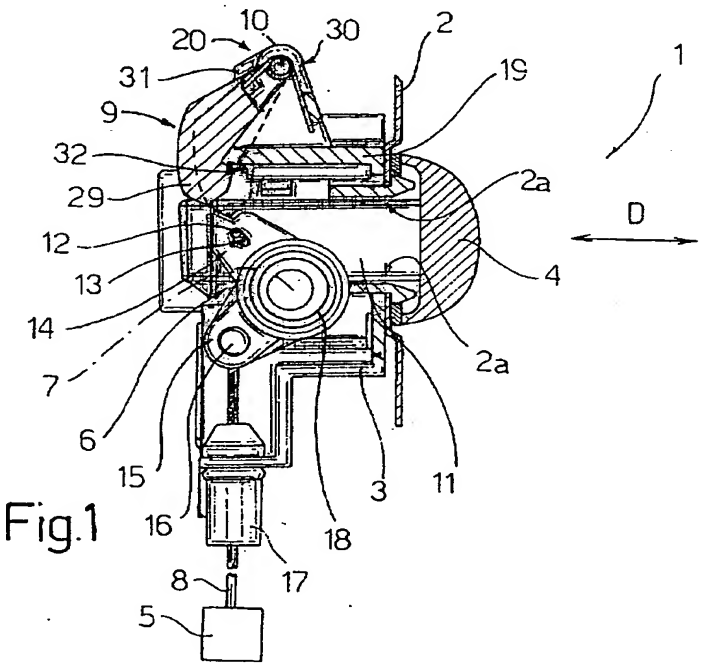

Fig.1

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Description

[0001] The present invention relates to a vehicle door handle, in particular for a motor vehicle.

[0002] More specifically, the present invention relates to a vehicle door handle comprising a frame connectable to the vehicle door; a rocker arm connected to the frame and rotating, about a first axis, between an open position and a closed position respectively opening and closing a lock on the door; and a retaining body hinged to the frame and rotated, by inertial forces and about a second axis parallel to the first axis, into a retaining position retaining the rocker arm in the closed position.

[0003] The retaining body is normally defined by a pendulum, which is moved by inertia, upon the vehicle being struck laterally, and in advance of any accidental inertial movement of the rocker arm, into a retaining position preventing any movement of the rocker arm into the open position.

[0004] The pendulum of known handles of the above type is connected to the frame by a wire torsion spring, which has two portions hinged to the frame, and an intermediate portion supporting the pendulum. More specifically, the intermediate portion of the spring is substantially U-shaped and inserted inside a griplike end of the pendulum; and the spring normally keeps the pendulum in a release position not interfering with the rocker arm.

[0005] A drawback of known handles of the above type is the weak connection of the pendulum to the frame by the wire spring. That is, the spring is relatively ineffective in keeping the pendulum in a definite axial position, so that the pendulum may be unable to act on the rocker arm when required, in the event permanent deformation of the spring or inevitable in-service vibration causes the pendulum to assume an incorrect axial position.

[0006] An incorrect axial position of the pendulum may also prevent it from assuming the correct retaining position normally defined by a stop shoulder integral with the frame. In which case, the inertial forces on the rocker arm are transmitted to the frame, not directly via the stop shoulder, but via the portions of the spring hinged to the frame, which portions may undergo permanent deformation, thus making the spring ineffective and so preventing any movement of the pendulum.

[0007] Another drawback of handles of the above type lies in the wire springs being particularly difficult to fit to the frame, which further increases the likelihood of the spring, and therefore the pendulum, being assembled incorrectly to the frame and so resulting in the drawback mentioned above.

[0008] It is an object of the present invention to provide a handle designed to eliminate the aforementioned drawbacks.

[0009] According to the present invention, there is provided a handle for a door of a vehicle, the handle comprising a frame fittable to the door of said vehicle; a rocker arm connected to said frame and rotating, about a first axis, between an open position and a closed position respectively opening and closing a lock on said door; and a retaining body hinged to said frame by hinge means and rotated, by inertial forces and about a second axis parallel to the first axis, into a retaining position retaining said rocker arm in said closed position; the handle being characterized in that said hinge means comprise a fork forming part of said frame; rigid pin means coaxial with said second axis and interposed between said fork and said retaining body; and contrasting elastic means carried by the rigid said pin means and interposed between said retaining body and said frame to normally keep the retaining body in a position of noninterference with said rocker arm.

[0010] A number of non-limiting embodiments of the invention will be described by way of example with reference to the accompanying drawings, in which:

Figure 1 shows a cross section of a handle in accordance with the teachings of the present invention;

Figure 2 shows a larger-scale, partly sectioned side view of a detail of the Figure 1 handle;

Figure 3 shows the same view as in Figure 2, of a variation of the Figure 2 detail.

[0011] Number 1 in Figure 1 indicates as a whole a handle for a door 2 of a vehicle (not shown).

[0012] Handle 1 comprises a frame 3 connected in known manner to an inner surface of door 2 at an opening 2a formed through door 2; and a lever 4 on the outside of an outer surface of door 2.

[0013] Lever 4 is hinged in known manner at one end (not shown) to frame 3 so as to rotate, with respect to door 2 and when operated by a user, about an axis (not shown) parallel to the Figure 1 plane and to door 2, and between a rest position (Figure 1) closing a known lock 5 on door 2, and a control position (not shown) opening lock 5. Handle 1 also comprises a rocker arm 6 connected to frame 3 and rotated, on frame 3 and about an axis 7 parallel to door 2 and perpendicular to the Figure 1 plane, to transmit the movement of lever 4 to a cable 8 activating lock 5; and a retaining body or pendulum 9 connected to frame 3 and rotated, by any inertial forces and about an axis 10 parallel to axis 7, from a normal position of noninterference with rocker arm 6, to a retaining position wherein pendulum 9 retains rocker arm 6 in a position corresponding to the rest position of lever 4.

[0014] On the end opposite the hinged end, lever 4 comprises an appendix 11, which extends crosswise to axis 7 and through opening 2a towards frame 3 and is movable with lever 4 in a direction D crosswise to axis 7 and to door 2. Appendix 11 is defined by a flat, substantially rectangular plate lying in a plane substantially parallel to the Figure 1 plane, and fitted, close to a free end opposite the end connected to lever 4, with a cylin-

drical pin 12, which is parallel to axis 7 and engages in rotary and transversely sliding manner an axial slot 13 formed along an arm 14 of rocker arm 6.

[0015] Rocker arm 6 comprises a further arm 15 substantially perpendicular to arm 14 and to axis 7, and fitted with a terminal 16 of cable 8, which is a known cable - in the example shown, a BOWDEN cable - and is connected to lock 5 through a cable guide 17 integral with frame 3.

[0016] Rocker arm 6 is connected to a helical torsion spring 18, which is coaxial with axis 7 and keeps rocker arm in a closed position (shown in Figure 1) wherein lever 4 is in the rest position closing lock 5, and lock 5 is in the closed position.

[0017] Frame 3 comprises a wall 19 perpendicular to the Figure 1 plane and extending crosswise to and inwards of door 2 alongside appendix 11; and a fork 20 in turn comprising two parallel, facing wings 21 and 22 extending in respective planes perpendicular to axes 7 and 10, and from the opposite surface of wall 19 to that facing appendix 11.

[0018] With reference to Figure 2, the free ends of wings 21 and 22 have respective through holes 23 and 24, which are coaxial with axis 10 and define respective seats engaged in rotary manner by respective end portions 25 and 26 of a cylindrical pin 27 mounted for rotation about axis 10 and having a central portion 28 integral with one end of pendulum 9.

[0019] Pendulum 9 is interposed between wings 21 and 22, extends from pin 27 towards appendix 11, and, at the free end opposite the end connected to pin 27, comprises a body 29, which, by means of a helical torsion spring 30 coaxial with axis 10, is normally maintained in said noninterference position (shown by the continuous line in Figure 1) contacting a stop member 31 integral with frame 3. In the event of lateral impact, pendulum 9 rotates by inertia (anticlockwise in Figure 1) about axis 10 and in opposition to spring 30 so that body 29 comes to rest against a shoulder 32 on wall 19 and in a retaining position (shown by the dash line in Figure 1) wherein body 29 interferes with the path of arm 14 to prevent rocker arm 6 - which, given its shape, is relatively unaffected by the inertial forces - from moving by force of inertia out of the closed position.

[0020] As shown in Figure 2, spring 30 comprises two ends 33 and 34 compressed against respective retaining ribs 35 and 36 integral with intermediate portions of wings 21 and 22 respectively; two helical portions 37 coaxial with axis 10 and wound about pin 27; and a substantially U-shaped central portion 38 forced against the surface of pendulum 9 facing lever 4.

[0021] In the Figure 3 variation, at the end connected to fork 20, pendulum 9 comprises two parallel, spaced appendixes 39 and 40, from which extend respective opposite pins 41 and 42 integral with respective appendixes 39 and 40 and coaxial with each other. Pin 41 extends from appendix 39 towards wing 21, and engages hole 23 in rotary manner.

[0022] Pin 42 has a central portion connected integrally to appendix 40, and projects outwards of appendix 40 to engage hole 24 in rotary manner. Pin 42 also comprises a portion 43, which is integral with appendix 40, projects towards and terminates a distance from appendix 39, and is wound with an intermediate helical portion 44 of a torsion spring 45, the opposite ends of which define two portions 46 and 47 compressed respectively against a retaining rib 48 carried by wing 22, and against the surface of pendulum 9 facing lever 4.

[0023] Operation of handle 1 is easily deducible from the foregoing description with no further explanation required. It should be pointed out, however, that providing pendulum 9 with a rigid hinge pin ensures extremely accurate guidance of pendulum 9 about axis 10, and a relatively high degree of safety of handle 1 as regards accidental opening of door 2 in the event of lateral impact. Using helical torsion springs, on the one hand, ensures pendulum 9 is subjected to specific and, above all, constant forces, even in the event of accidental impact, and, on the other, provides for fast, easy assembly of the springs to the various rigid pins and for univocal positioning of the pendulum 9.

Claims

1. A handle (1) for a door (2) of a vehicle, the handle (1) comprising a frame (3) fittable to the door (2) of said vehicle; a rocker arm (6) connected to said frame (3) and rotating, about a first axis (7), between an open position and a closed position respectively opening and closing a lock (5) on said door (2); and a retaining body (9) hinged to said frame (3) by hinge means and rotated, by inertial forces and about a second axis (10) parallel to the first axis (7), into a retaining position retaining said rocker arm (6) in said closed position; the handle (1) being characterized in that said hinge means comprise a fork (20) forming part of said frame (3); rigid pin means (27)(41, 42) coaxial with said second axis (10) and interposed between said fork (20) and said retaining body (9); and contrasting elastic means (30) (45) carried by the rigid said pin means (27) (41, 42) and interposed between said retaining body (9) and said frame (3) to normally keep the retaining body (9) in a position of noninterference with said rocker arm (6).

2. A handle as claimed in Claim 1, wherein the rigid said pin means (27) (41, 42) are connected to said retaining body (9); seating means (23, 24) being formed on said fork (20) to receive said pin means (27) (41, 42).

3. A handle as claimed in Claim 2, wherein said pin means (27) (41, 42) are integral with said retaining body (9) and engage said seating means (23, 24)

in rotary manner.

4. A handle as claimed in Claim 2 or 3, wherein said fork (20) comprises two wings (21, 22) parallel to each other and perpendicular to said second axis (10); said seating means (23, 24) comprising, for each said wing (21, 22), a through hole (23, 24) formed through the respective wing (21, 22) and engaged in rotary manner by said pin means (27) (41, 42).

5. A handle as claimed in one of the foregoing Claims, wherein said pin means (41, 42) comprise two separate, opposite first pins (41, 42) coaxial with each other and with said second axis (10).

6. A handle as claimed in Claim 5, wherein said pin means (27) comprise a third pin (43) integral and coaxial with one of said first pins (41, 42) and terminating in a position axially detached from the other of said first pins; said elastic means (45) being carried by said third pin (45).

7. A handle as claimed in one of Claims 1 to 4, wherein said pin means (27) comprise a single pin (27) having a central portion (28) connected to said retaining body (9), and two opposite end portions (25, 26) connected to said seating means (23, 24); said elastic means (30) being carried at least partly by said two end portions (25, 26).

8. A handle as claimed in one of the foregoing Claims, wherein said elastic means (30) (45) comprise at least one helical spring (30), in turn comprising a first portion (38) (47) cooperating with said retaining body (9), a second portion (35, 36)(46) cooperating with said fork (20), and at least one helical third portion (37) (44) coaxial with said second axis (10) and wound about at least one of said pins (27; 43).

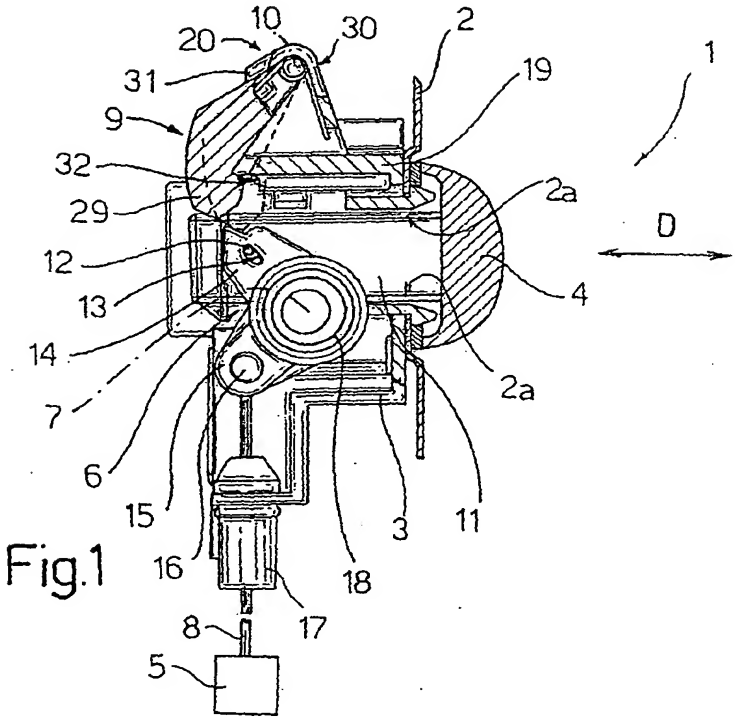

Fig.1

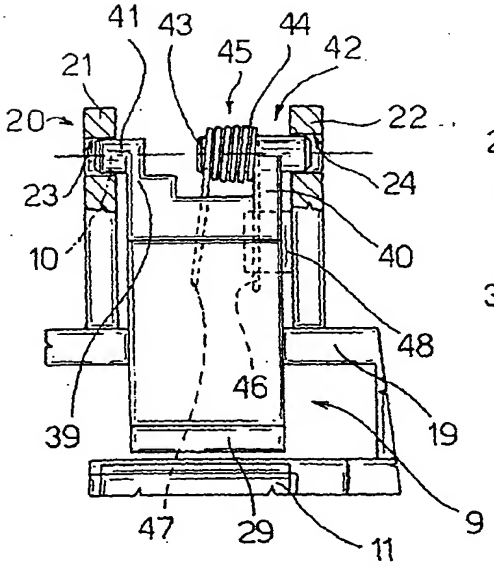

Fig.3

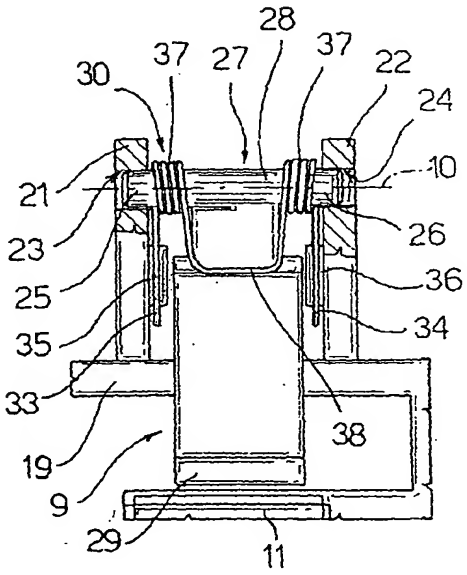

Fig.2

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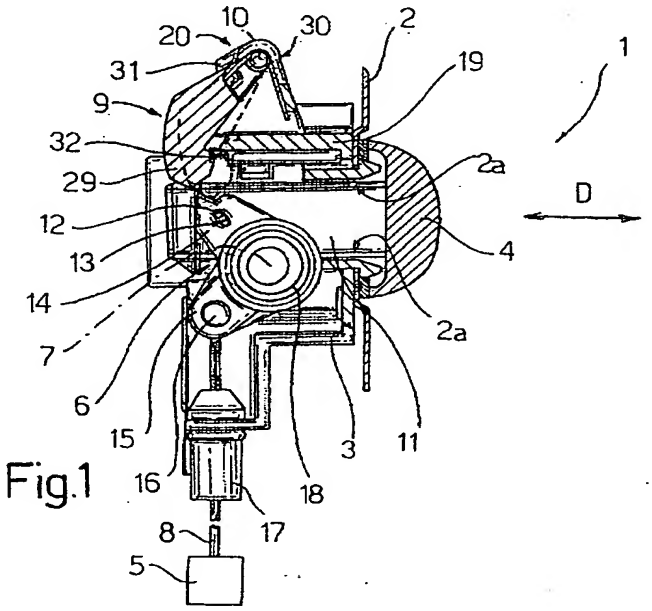

Fig.1

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EUROPEAN SEARCH REPORT

Application Number
EP 01 10 4177

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A	US 3 719 248 A (GMEINER G ET AL) 6 March 1973 (1973-03-06) * the whole document *	1	E05B7/00 E05B65/20
A	US 6 007 122 A (LINDER ANTON ET AL) 28 December 1999 (1999-12-28) * the whole document *	1	
A	DE 195 11 651 A (VOLKSWAGENWERK AG) 19 October 1995 (1995-10-19) * the whole document *	1	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7) E05B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	11 April 2002	Westin, K

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Patent document cited in search report		Publication date		Patent family member(s)	Publication date
US 3719248	A	06-03-1973	DE	2023859 A1	25-11-1971
			FR	2091627 A5	14-01-1972
			JP	54042488 B	14-12-1979
US 6007122	A	28-12-1999	DE	19610200 A1	18-09-1997
			BR	9701288 A	10-11-1998
			EP	0795667 A2	17-09-1997
DE 19511651	A	19-10-1995	DE	19511651 A1	19-10-1995

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